Structural heterogeneity, clusters and glass relaxation in inorganic glasses

- An Invited Talk

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Structural heterogeneity in glass is a current important topic in glass science. Detection and investigation of this topic is crucial to understanding the nature of glass state, the glass dynamics and glass transition. Control of structural heterogeneity of glass is also critical for tailoring glass functionalities. In this presentation I review our recent progress in study of the structural heterogeneity in glasses, particularly in poor glass formers, which is done by carrying out enthalpy relaxation experiments. The main methods are the hyperquenching-annealing-calorimetric scan approach, nuclear magnetic resonance and x-ray scattering. Furthermore I discuss the microsopic origin of polyamorphic transitions and the fragile-to-strong liquid transition in glass. The role of cluster evolution in determining the supercooled liquid dynamics will be emphasized. Finally I describe some challenges and perspectives in investigating the structural heterogeneity in a more quantitative manner.

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